Thacher Truss Bridge
Over Linville Creek
Broadway
Rockingham County
Virginia

HAER No. VA-35

PHOTOGRAPHS

HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D. C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

Thacher Truss Bridge

VA-35

Location:	Over Linville Creek Broadway Rockingham County, Virginia
Date of Construction:	1898
Fabricated by:	Wrought Iron Bridge Company of Canton, Ohio based on designs patented by Edwin Thacher
Present Owner:	Department of Virginia Highways and Transportation
Significance:	This structure is an excellent example of an uncommon type of truss bridge. The following discussion is taken from a description of the Thacher Truss that appeared in the January/March 1979 issue of the Society for Industrial Archeology Newsletter:

Although economic considerations encouraged standardization of bridge truss systems, engineers continued to innovate with truss designs throughout the 19th century. Among these is the Thacher Truss, developed by Edwin Thacher (1840-1920), chief engineer of the Keystone Bridge Co. of Pittsburgh. An 1863 graduate of Rensselaer Polytechnic Institute, Thacher first described his truss to the ASCE membership in Nov. 1883 and it was published in their 1884 Transactions.

In its basic form the truss combines features of the multiple-intersection Pratt and Warren trusses, and utilizes certain design principles employed in the Bollman and Fink trusses. Thacher referred to it as a "combination of the triangular [Pratt/Warren] and suspension [Bollman/Fink] systems" and indicated that the members were arranged and connected with one another in a manner "free to change figure from the effect of temperature." Thacher believed temperature stresses to be very significant within many truss bridges he had inspected and his truss was designed so that "the inclined suspenders are connected with each

other at (the) bottom (of the vertical compression members) but have no fixed connection with the bottom chord." Thacher stated that this insured that there was only one route for the load at any panel point to take to the abutments, eliminating temperature stresses within the truss.

The article illustrated variously lengthed versions of the truss, the longest stretching to over 500 ft. Most of these designs never moved beyond the theoretical, however, as the actual use of the Thacher Truss was confined to spans less than 200 ft.

Thacher worked for Keystone (a firm closely associated with Andrew Carnegie's iron and steel empire) at the time he introduced his truss, and it is interesting that he advocated its use as a composite structure with wood for the compression members and iron for the tension members. The first Thacher Truss was such a combination, a 147.4-ft. span built in 1881 for the Burlington, Cedar Rapids & Northern RR over Iowa's Wapsipinicon River. Thacher claimed this structure deflected only 3/4 of an inch when loaded with three engines. The design was also used for all-metal bridges, and the Wrought Iron Bridge Co. of Canton, Ohio, fabricated several examples. At present (1984), the oldest known surviving Thacher Truss is the 1889 all-metal Niver Road Bridge over the Shiawasee River in Saginaw Co., Mich., identified in HAER's 1975 Lower Michigan Inventory.

In his ASCE obituary, Thacher is credited with designing over 1,000 bridges in the U.S. during the late 19th and early 20th centuries. These included the Topeka River Bridge (1897) in Topeka, Kansas, the first major multi-span reinforced-concrete bridge in the U.S., and the 6-span Walnut St. Bridge of 1891 over the Tennessee River in Chattanooga. This latter bridge employs pin-connected "camelback" trusses with subdivided panels, not Thacher trusses, indicating that Thacher by no means limited his efforts to his own special truss type.

Though the Thacher Truss never was built in great numbers and cannot be considered a major development in the history of engineering design, it is significant in representing the efforts of a major 19thC bridge engineer to improve truss bridge design.

Transmittal Written and Prepared by: Donald C. Jackson, 1984